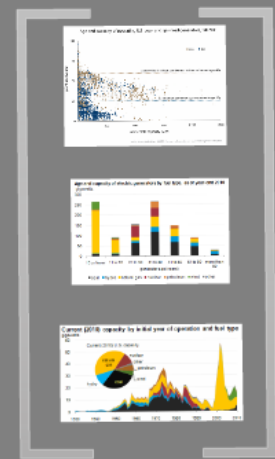
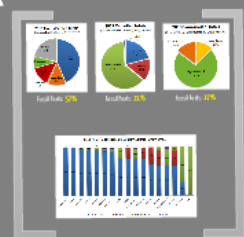
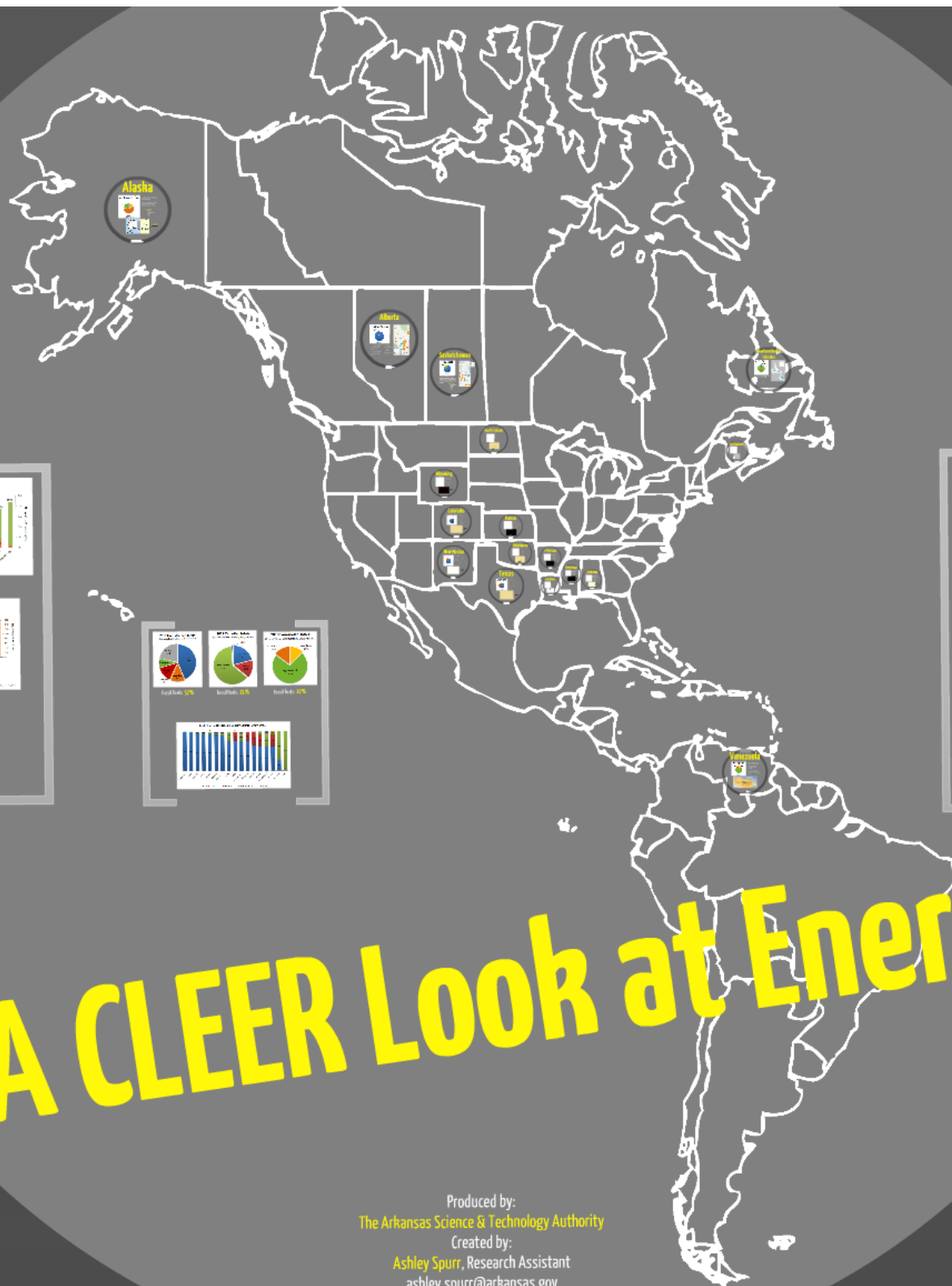


# A CLEER Look at Energy

Produced by:  
The Arkansas Science & Technology Authority  
Created by:  
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Edits by:  
Dr. John Ahlen, President  
john.ahlen@arkansas.gov

July 2016

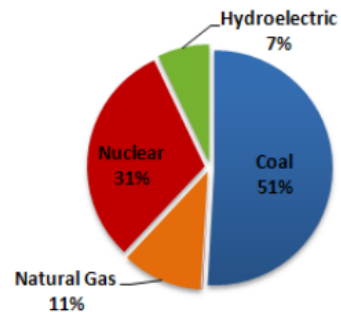


# A CLEAR Look at Energy

Produced by:  
The Arkansas Science & Technology Authority  
Created by:  
Ashley Spurr, Research Assistant  
ashley.spurr@arkansas.gov

# Alabama

**Energy Sources (%) used to Generate Electric Utilities, 2010**



ALABAMA

Energy sources used <1% not listed.

- Fossil fuels provide 2/3 of electric utilities.
- Ranked 6th in U.S. for generating electric utilities from renewable energy resources.

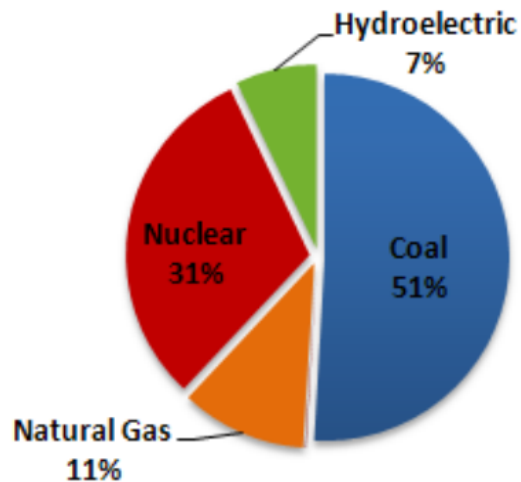
## Power Plants:

- 25 natural gas
- 24 hydro
- 11 coal
- 2 nuclear



4 Types of Power Plants

## Energy Sources (%) used to Generate Electric Utilities, 2010



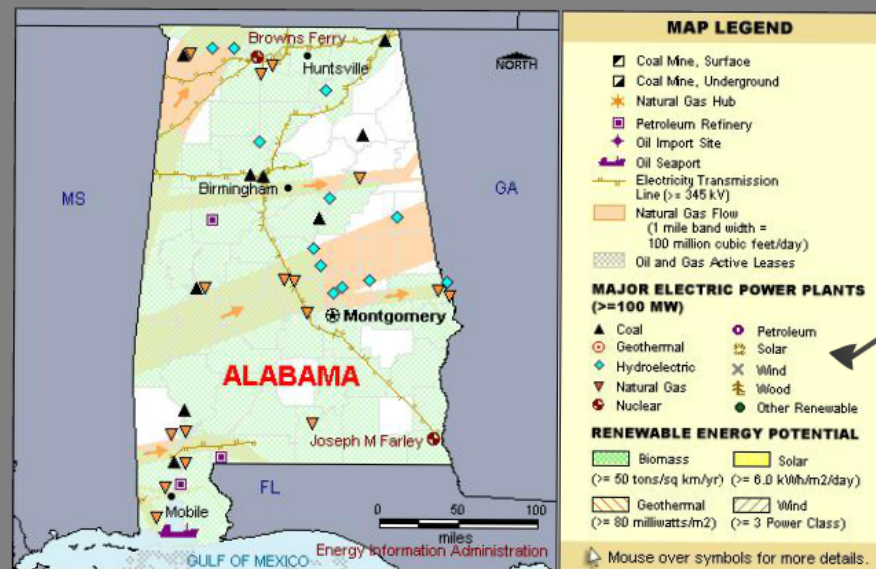
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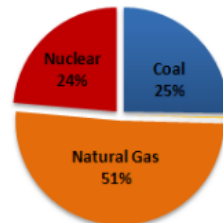


4 Types of Power Plants



# Mississippi

**Energy Sources (%) used to Generate Electric Utilities, 2010**



MISSISSIPPI

Energy sources used <1% not listed.

- Over 1/2 of electric utilities come from natural gas.
- Ranks 28th in net generation of electric utilities

## Power Plants:

- 28 natural gas
- 4 coal
- 1 nuclear
- 1 wood



4 Types of Power Plants

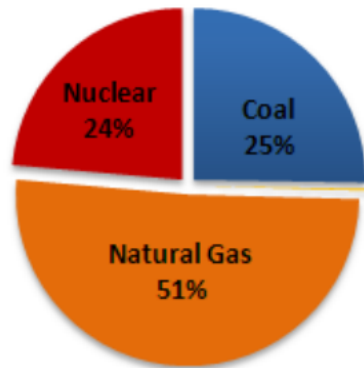
Sources

<http://www.eia.gov/electricity/data/eia860/index.html>

[http://www.eia.gov/electricity/data/state/generation\\_annual.xls](http://www.eia.gov/electricity/data/state/generation_annual.xls)

<http://www.eia.gov/state/state-energy-profiles.cfm?sid=MS>

## Energy Sources (%) used to Generate Electric Utilities, 2010



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Energy sources used <1% not listed.

- Over 1/2 of electric utilities come from natural gas.
- Ranks 28th in net generation of electric utilities

### Power Plants:

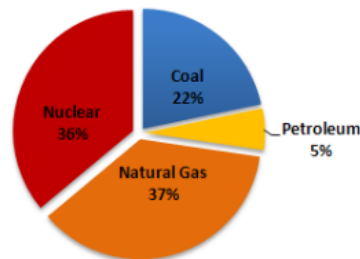
- 28 natural gas
- 4 coal
- 1 nuclear
- 1 wood



4 Types of Power Plants

# Louisiana

**Energy Sources (%) used to Generate Electric Utilities, 2010**



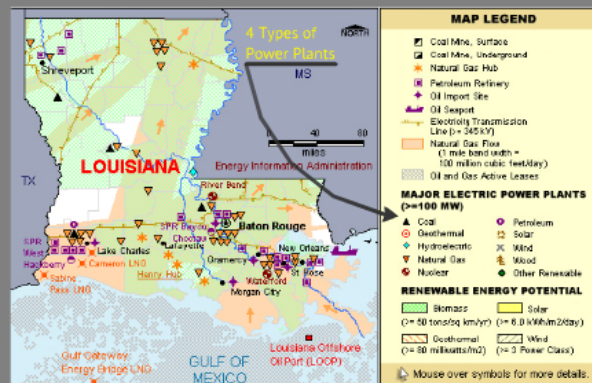
LOUISIANA

Energy sources used <1% not listed.

- Almost 2/3 of electric utilities from fossil fuels.
- Highest natural gas storage capacity in U.S.

## Power Plants:

- 51 natural gas
- 7 petroleum
- 4 coal
- 2 nuclear
- 1 hydro



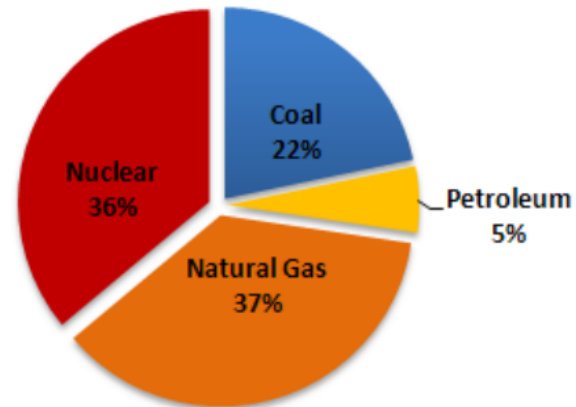
Sources

<http://www.eia.gov/electricity/data/eia860/index.html>

[http://www.eia.gov/electricity/data/state/generation\\_annual.xls](http://www.eia.gov/electricity/data/state/generation_annual.xls)

<http://www.eia.gov/state/state-energy-profiles.cfm?id=LA>

## Energy Sources (%) used to Generate Electric Utilities, 2010



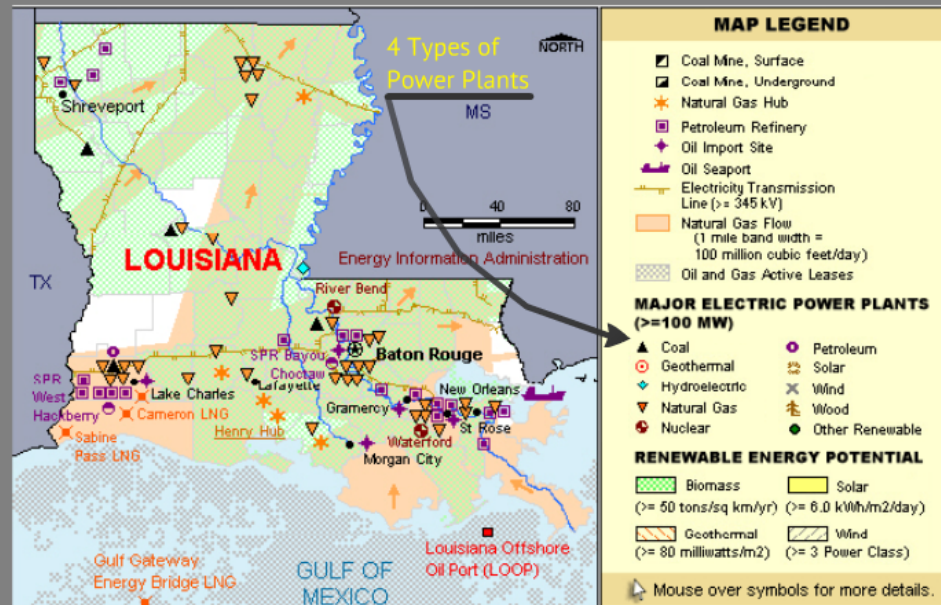
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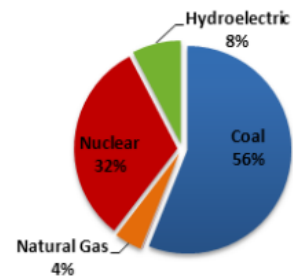
### Power Plants:

- 51 natural gas
- 7 petroleum
- 4 coal
- 2 nuclear
- 1 hydro



# Arkansas

**Energy Sources (%) used to Generate Electric Utilities, 2010**



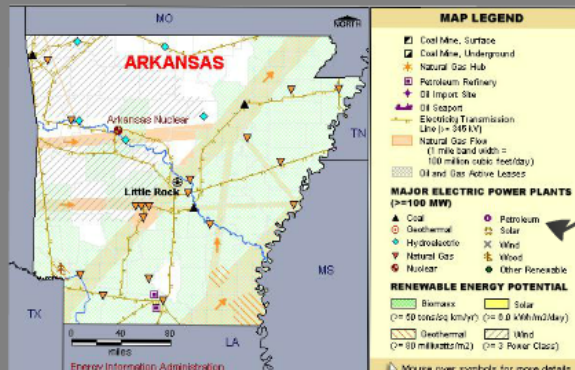
ARKANSAS

Energy sources used <1% not listed.

- Fossil fuels supply almost 2/3 of electric utilities
- Coal & nuclear are the dominant energy sources for utilities

## Power Plants:

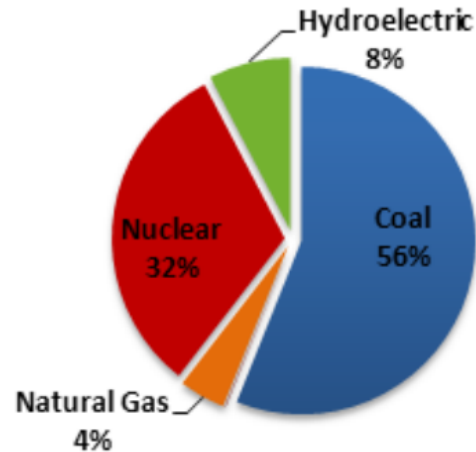
- 19 hydro
- 14 natural gas
- 4 petroleum
- 4 coal
- 2 wood
- 1 nuclear



5 Types of Power Plants



## Energy Sources (%) used to Generate Electric Utilities, 2010



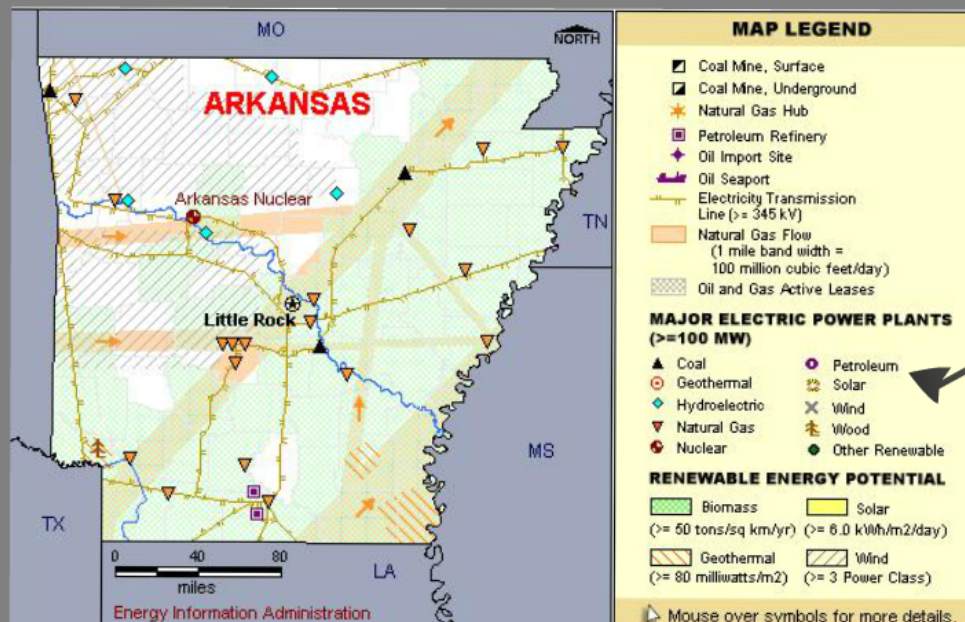
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- 14 natural gas
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- 2 wood
- 1 nuclear

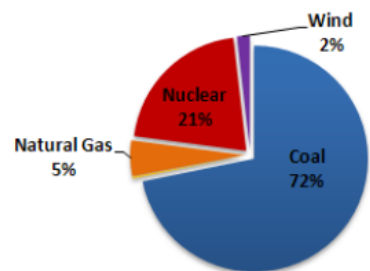


5 Types of Power Plants



# Kansas

**Energy Sources (%) used to Generate Electric Utilities, 2010**



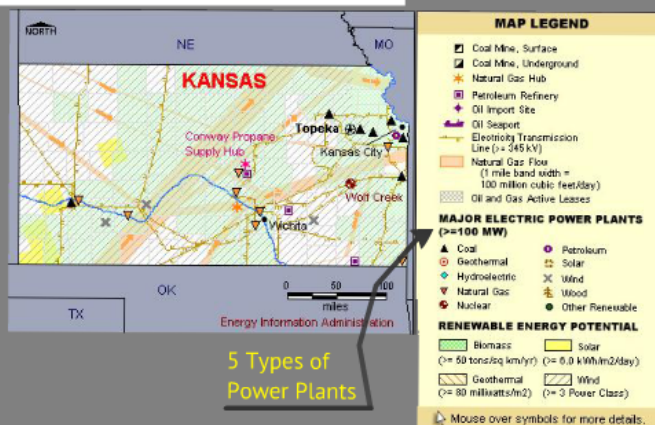
KANSAS

Energy sources used <1% not listed.

- Coal provides nearly 3/4 of electric utilities
- 8% of net electricity generation came from wind energy in 2011

## Power Plants:

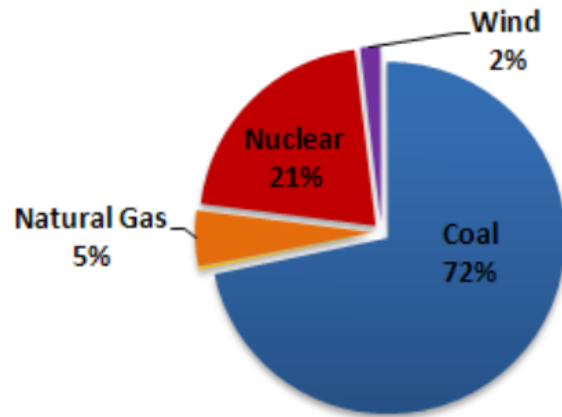
- 23 natural gas
- 8 coal
- 3 wind
- 1 nuclear



5 Types of Power Plants

Sources  
<http://www.eia.org/electricity/data/eia860index.html>  
[http://www.eia.org/electricity/data/eia860generation\\_annual.xls](http://www.eia.org/electricity/data/eia860generation_annual.xls)  
[http://www.eia.gov/state/state\\_energy\\_profiles/cfm?sl=CS](http://www.eia.gov/state/state_energy_profiles/cfm?sl=CS)

## Energy Sources (%) used to Generate Electric Utilities, 2010



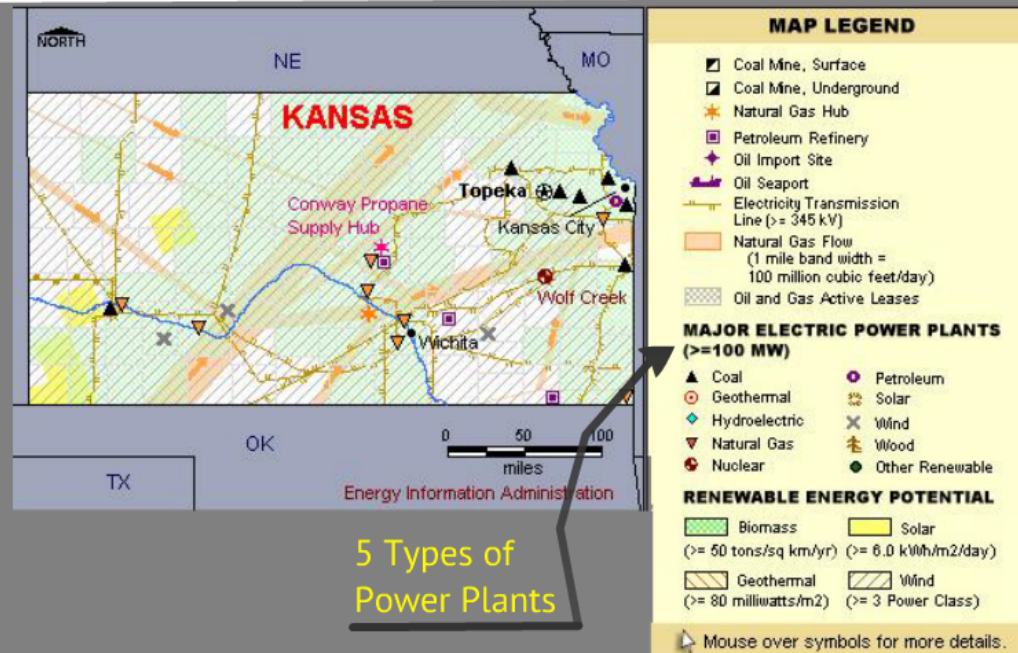
KANSAS

Energy sources used <1% not listed.

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### Power Plants:

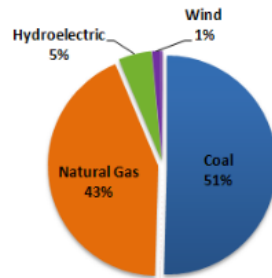
- 23 natural gas
- 8 coal
- 3 wind
- 1 nuclear



5 Types of Power Plants

# Oklahoma

**Energy Sources (%) used to Generate Electric Utilities, 2010**



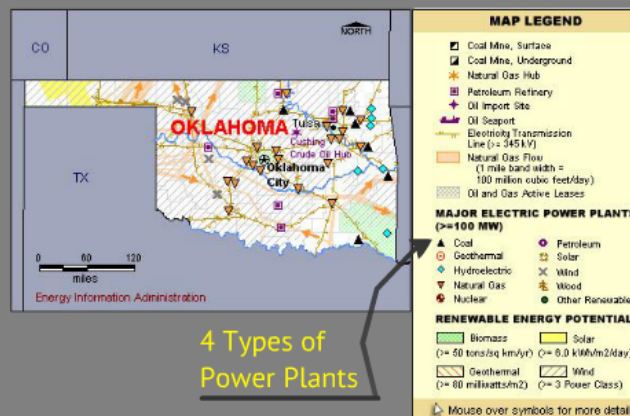
OKLAHOMA

Energy sources used <1% not listed.

- Over 90% of electric utilities derived from coal & natural gas
- Of the 100 largest natural gas fields in the U.S., 12+ are in Oklahoma

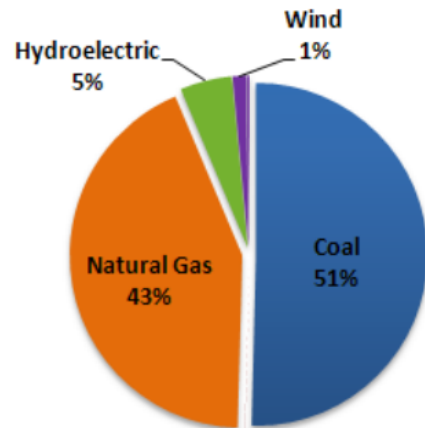
## Power Plants:

- 25 natural gas
- 11 hydro
- 7 coal
- 2 wind



4 Types of Power Plants

## Energy Sources (%) used to Generate Electric Utilities, 2010



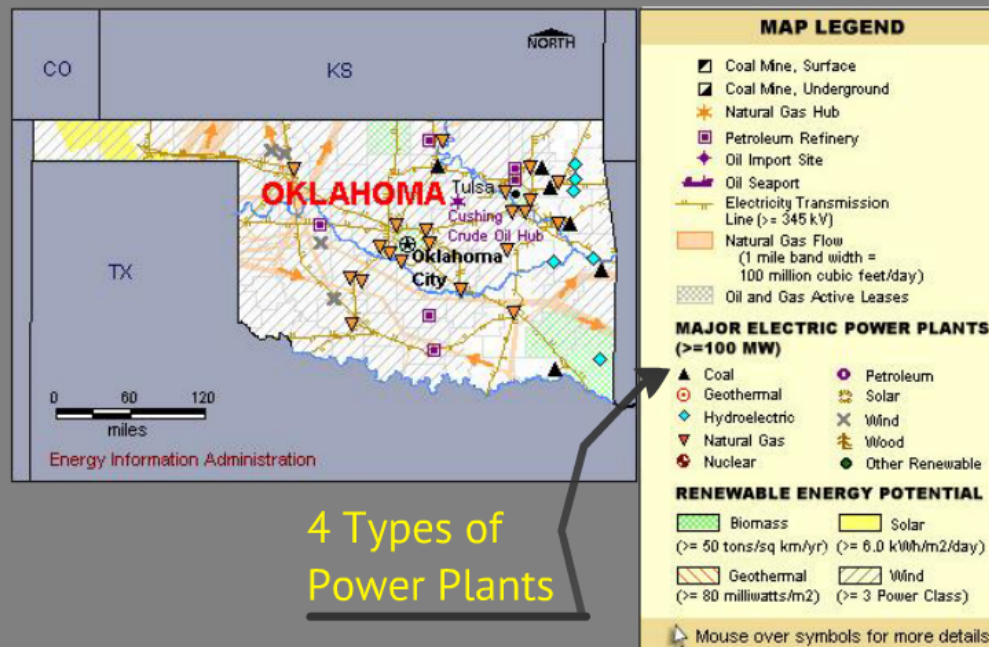
OKLAHOMA

Energy sources used <1% not listed.

- Over 90% of electric utilities derived from coal & natural gas
- Of the 100 largest natural gas fields in the U.S., 12+ are in Oklahoma

### Power Plants:

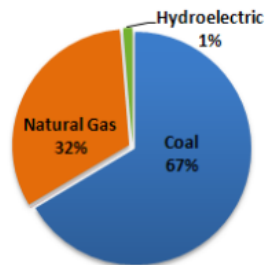
- 25 natural gas
- 11 hydro
- 7 coal
- 2 wind



4 Types of Power Plants

# Texas

**Energy Sources (%) used to Generate Electric Utilities, 2010**



TEXAS

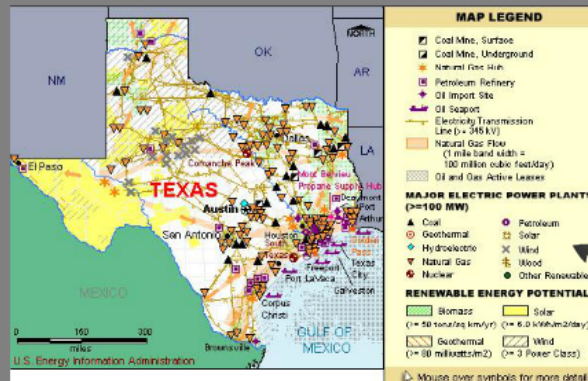
Energy sources used <1% not listed.

- 99% of generated electric utilities come from coal & natural gas

- Texas produces and consumes more electricity than any other state

## Power Plants:

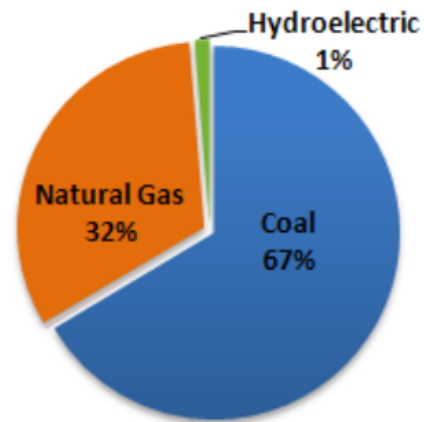
- 146 natural gas
- 23 hydro
- 20 coal
- 2 nuclear
- 2 wind



6 Types of Power Plants



## Energy Sources (%) used to Generate Electric Utilities, 2010



TEXAS

Energy sources used <1% not listed.

- 99% of generated electric utilities come from coal & natural gas
- Texas produces and consumes more electricity than any other state

### Power Plants:

- 146 natural gas
- 23 hydro
- 20 coal
- 2 nuclear
- 2 wind

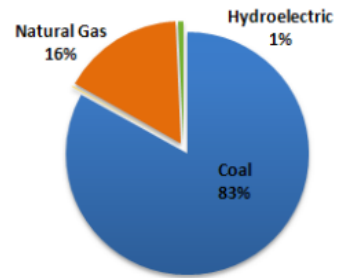


6 Types of Power Plants



# New Mexico

**Energy Sources (%) used to Generate Electric Utilities, 2010**



NEW MEXICO

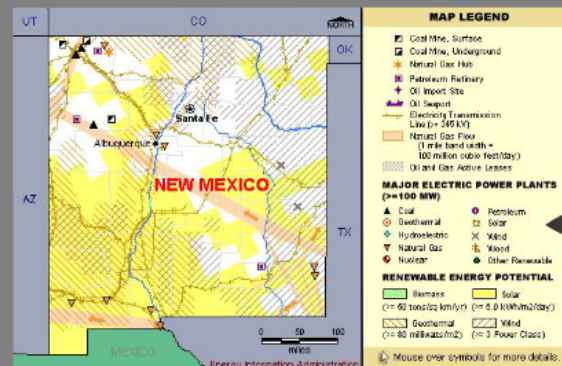
Energy sources used <1% not listed.

- 99% of generated electric utilities come from fossil fuels.

- San Juan Basin in the northwest, is the largest field of proved natural gas reserves in the U.S.

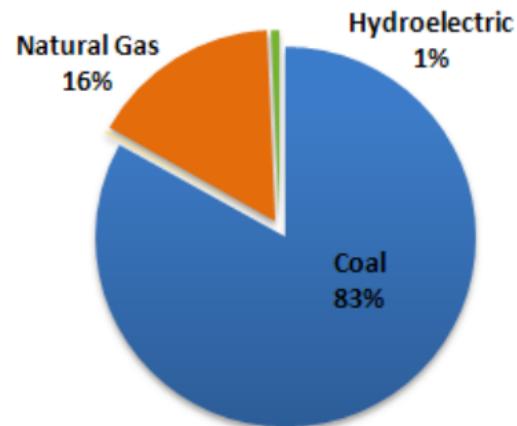
## Power Plants:

- 17 natural gas
- 5 hydro
- 3 coal
- 3 solar



3 Types of Power Plants

## Energy Sources (%) used to Generate Electric Utilities, 2010



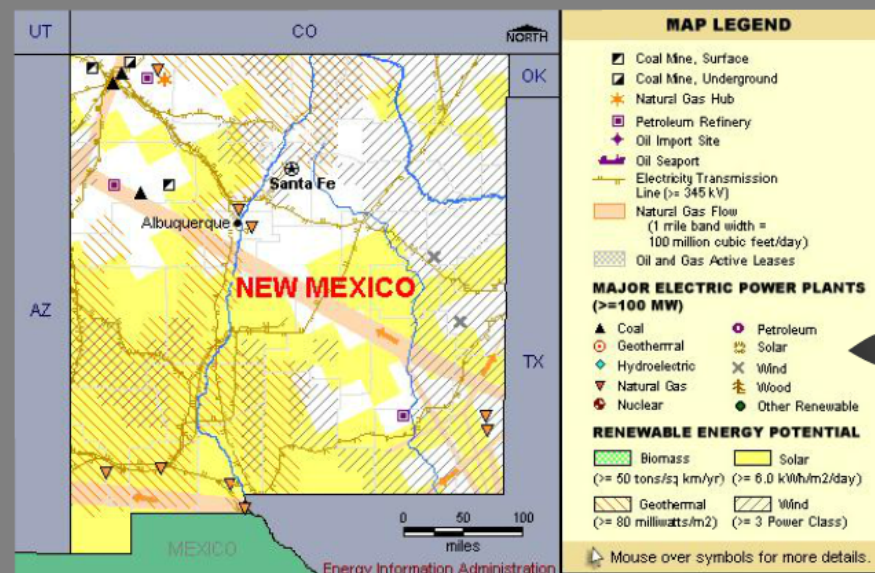
NEW MEXICO

Energy sources used <1% not listed.

- 99% of generated electric utilities come from fossil fuels.
- San Juan Basin in the northwest, is the largest field of proved natural gas reserves in the U.S.

### Power Plants:

- 17 natural gas
- 5 hydro
- 3 coal
- 3 solar

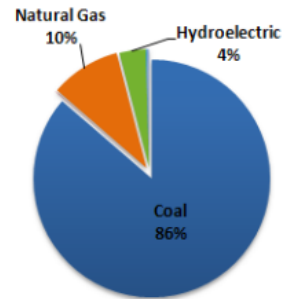


3 Types of Power Plants



# Colorado

**Energy Sources (%) used to Generate Electric Utilities, 2010**



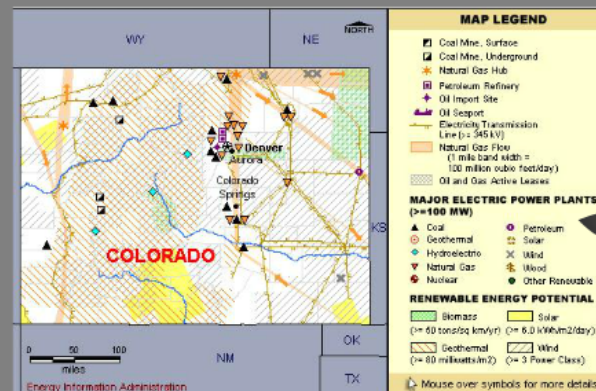
COLORADO

Energy sources used <1% not listed.

- Over 95% of electric utilities derived from fossil fuels.
- Accounts for >5% of U.S. natural gas production.

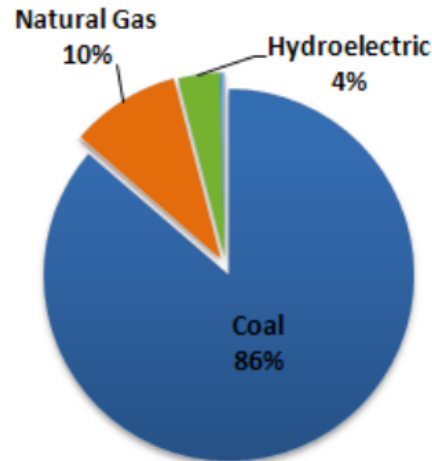
## Power Plants:

- 25 hydro
- 21 natural gas
- 15 coal
- 2 wind



5 Types of Power Plants

## Energy Sources (%) used to Generate Electric Utilities, 2010



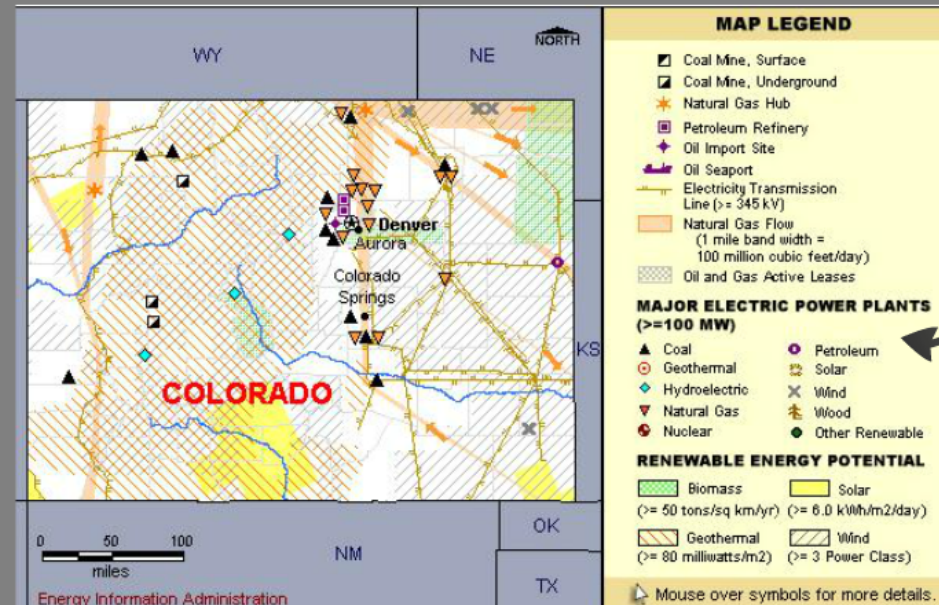
COLORADO

Energy sources used <1% not listed.

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- Accounts for >5% of U.S. natural gas production.

### Power Plants:

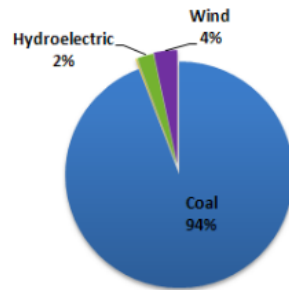
- 25 hydro
- 21 natural gas
- 15 coal
- 2 wind



5 Types of Power Plants

# Wyoming

**Energy Sources (%) used to Generate Electric Utilities, 2010**



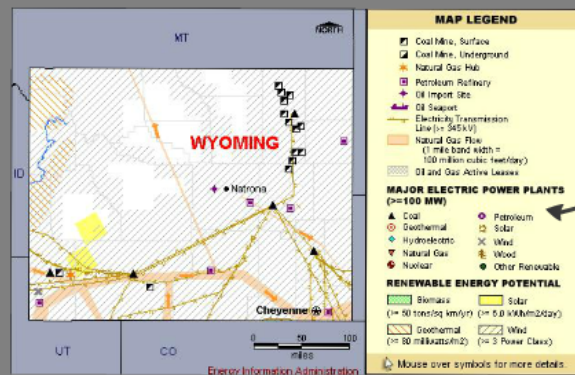
WYOMING

Energy sources used <1% not listed.

- Roughly 94% of generated electric utilities are from coal.
- In 2011, 35 States received coal from Wyoming mines.
- 8 states bought more than 90% of their coal from Wyoming.

## Power Plants:

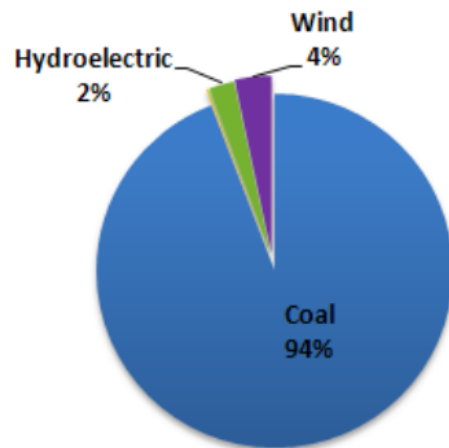
- 15 hydro
- 12 coal
- 9 natural gas
- 7 wind



2 Types of Power Plants



## Energy Sources (%) used to Generate Electric Utilities, 2010



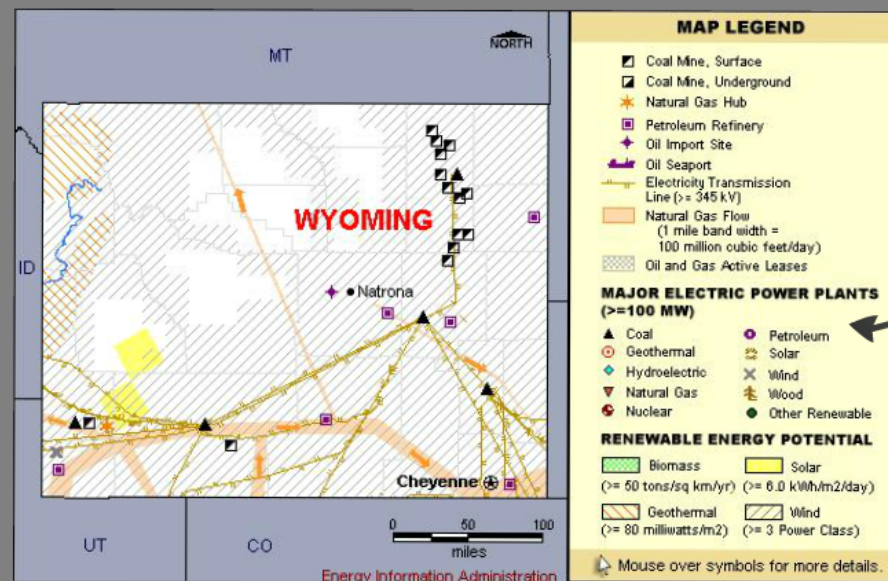
WYOMING

Energy sources used <1% not listed.

- Roughly 94% of generated electric utilities are from coal.
- In 2011, 35 States received coal from Wyoming mines.
- 8 states bought more than 90% of their coal from Wyoming.

### Power Plants:

- 15 hydro
- 12 coal
- 9 natural gas
- 7 wind

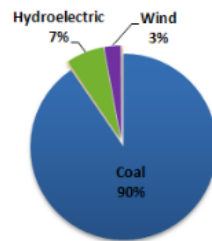


2 Types of Power Plants



# North Dakota

**Energy Sources (%) used to Generate Electric Utilities, 2010**



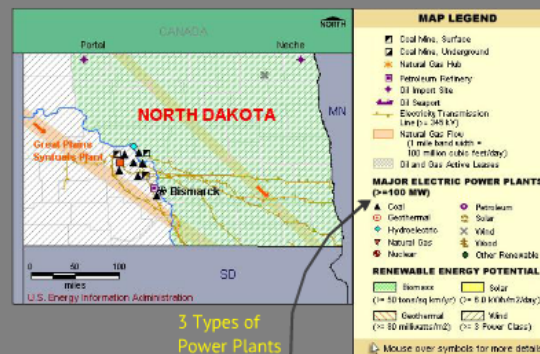
NORTH DAKOTA

Energy sources used <1% not listed.

- Coal is primary source of generated electric utilities
- 20+ operational wind power projects
- Leads U.S. in wind power potential

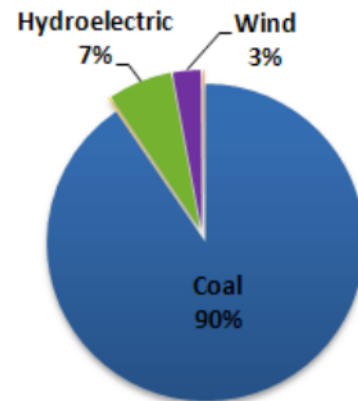
## Power Plants:

- 10 coal
- 7 wind
- 1 natural gas
- 1 water



3 Types of Power Plants

## Energy Sources (%) used to Generate Electric Utilities, 2010



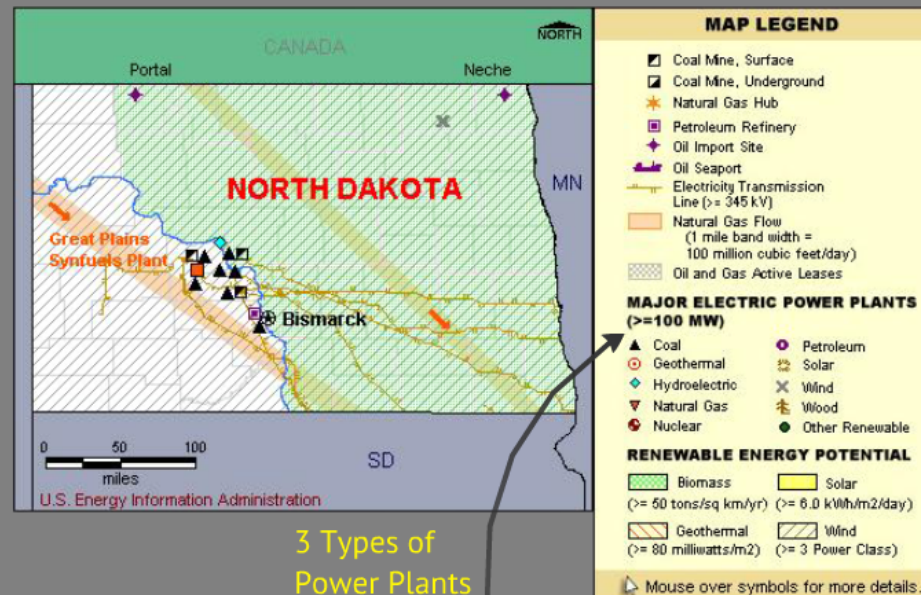
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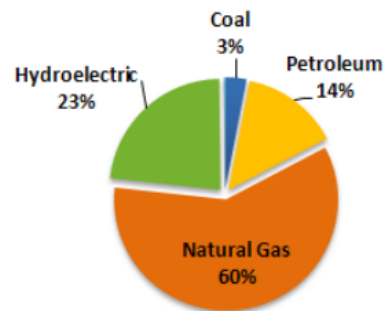
### Power Plants:

- 10 coal
- 7 wind
- 1 natural gas
- 1 water



# Alaska

**Energy Sources (%) used to Generate Electric Utilities, 2010**



ALASKA

Energy sources used <1% not listed.

- One of the highest natural gas generating states.
- In 2011, 1 of only 8 U.S. states generating electricity from geothermal energy sources.

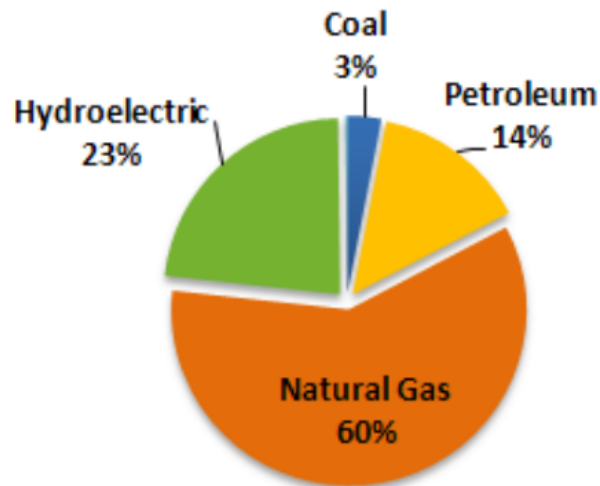
## Power Plants:

- 29 hydro
- 10 natural gas
- 5 coal
- 2 wind



3 Types of Power Plants

## Energy Sources (%) used to Generate Electric Utilities, 2010



ALASKA

Energy sources used <1% not listed.

- One of the highest natural gas generating states.
- In 2011, 1 of only 8 U.S. states generating electricity from geothermal energy sources.

### Power Plants:

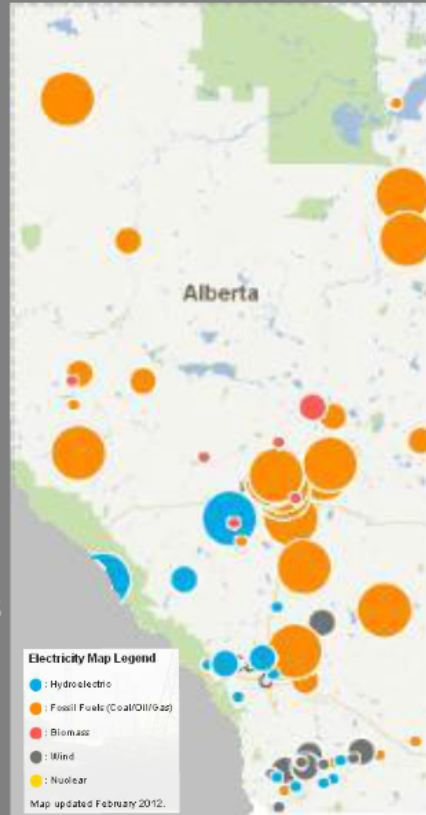
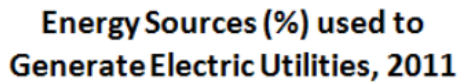
- 29 hydro
- 10 natural gas
- 5 coal
- 2 wind



3 Types of Power Plants



# Alberta

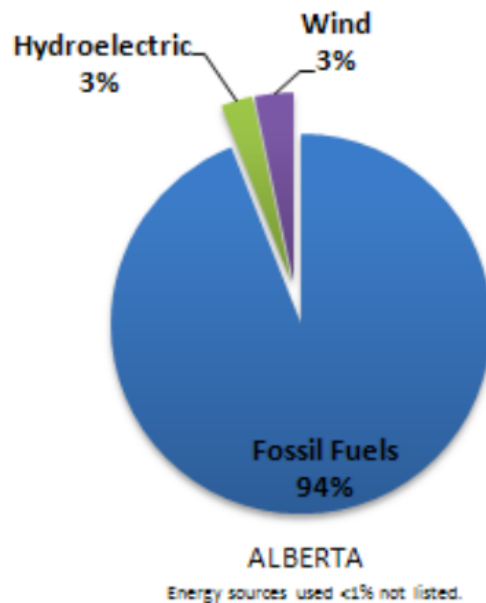


- 33% of electricity generation from natural gas
  - 52% of electricity generation from coal
- Power Plants:**
- 68 natural gas
  - 29 wind
  - 22 hydro
  - 11 biomass
  - 9 coal

## Power Plants:



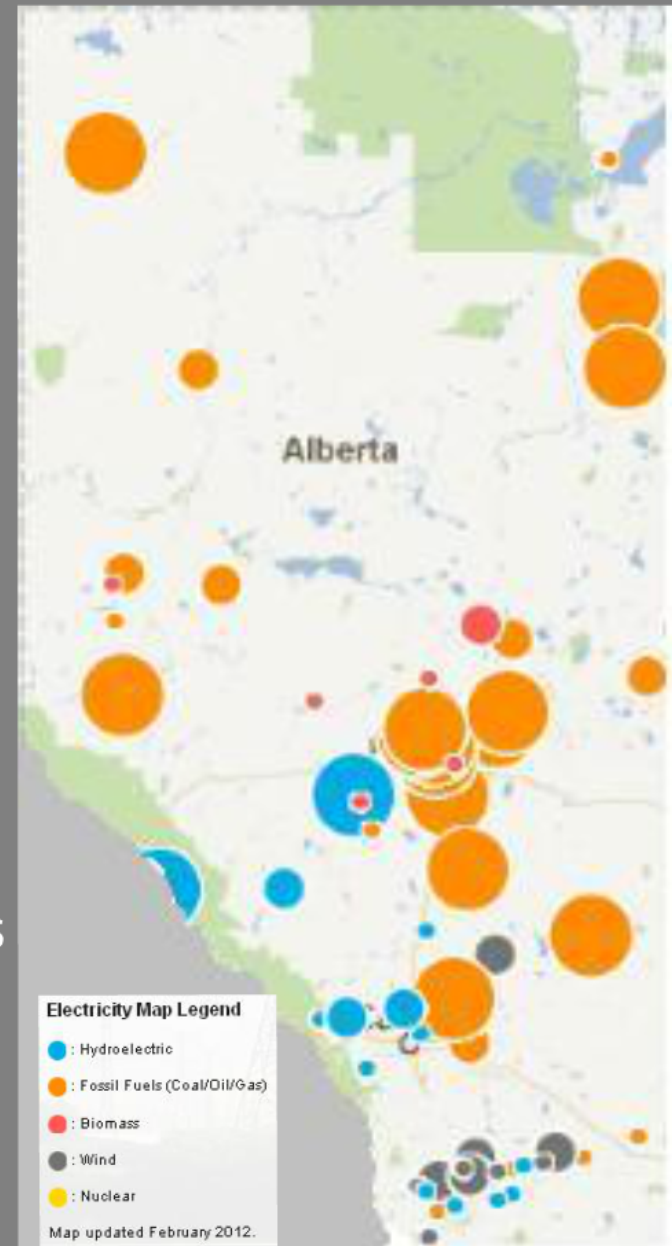
## Energy Sources (%) used to Generate Electric Utilities, 2011



- 33% of electricity generation from natural gas
- 52% of electricity generation from coal

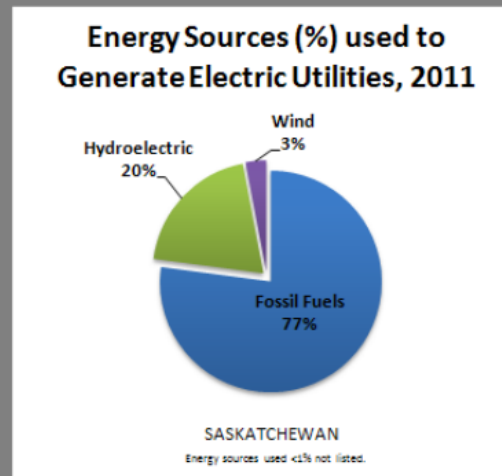
### Power Plants:

- 68 natural gas
- 29 wind
- 22 hydro
- 11 biomass
- 9 coal





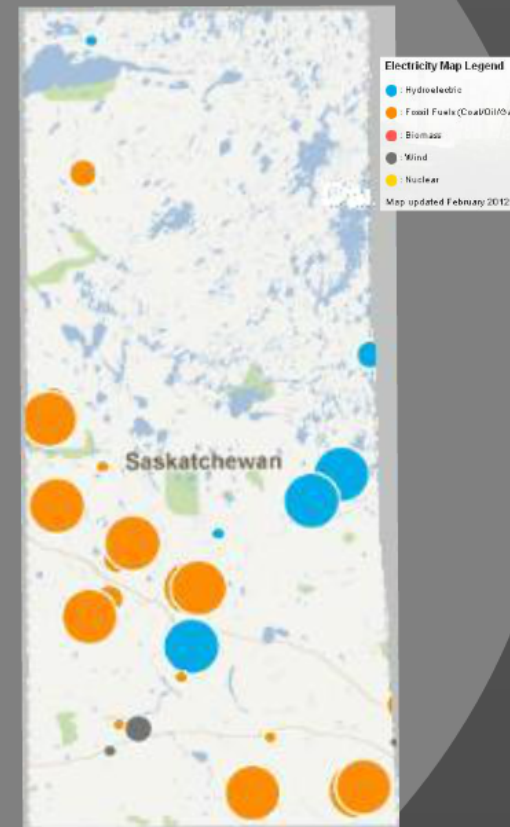
# Saskatchewan



- 2nd largest oil producer in Canada.
- 6th largest oil producer among all American states & Canadian provinces.
- Canada's 3rd largest producer of coal & natural gas.

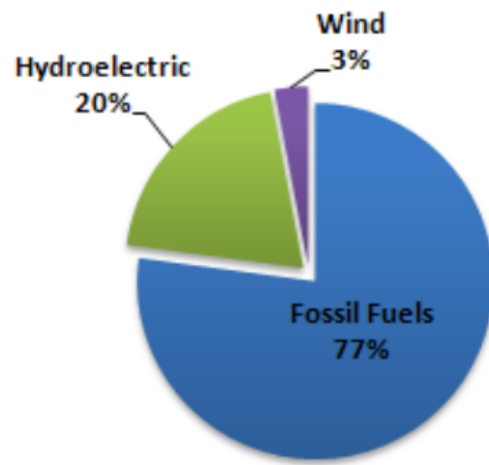
## Power Plants

- 15 natural gas
- 7 hydro
- 4 wind
- 3 coal



Sources  
David Carson - Canadian Centre for Energy Information  
<http://www.centreforenergy.com/Documents/AboutEnergyByTheNumbers/CSKHydroNumbers.pdf>  
<http://www.3wspower.melbtricity.com.au/>  
[http://www.ir.gov.sk.ca/Fact\\_Sheets](http://www.ir.gov.sk.ca/Fact_Sheets)

## Energy Sources (%) used to Generate Electric Utilities, 2011



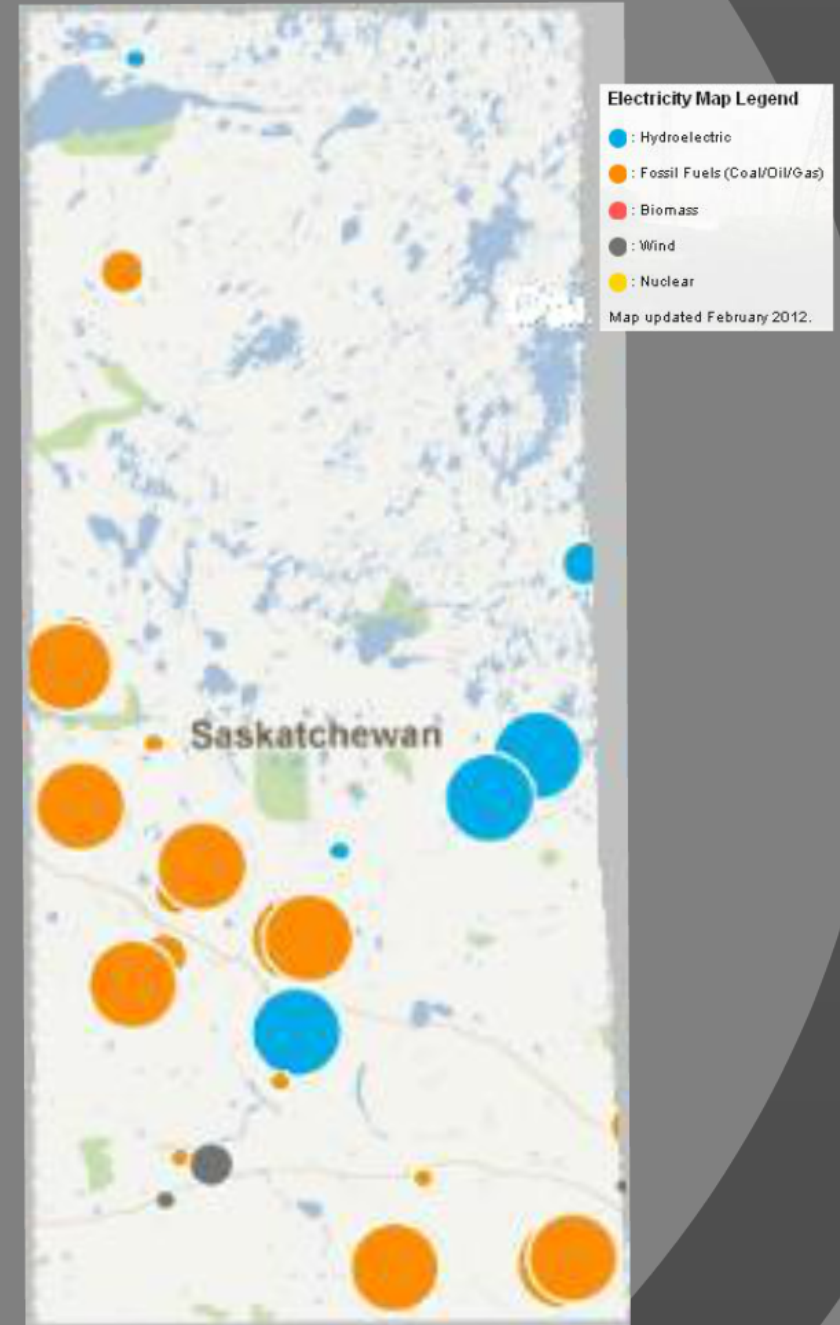
SASKATCHEWAN

Energy sources used <1% not listed.

- 2nd largest oil producer in Canada.
- 6th largest oil producer among all American states & Canadian provinces.
- Canada's 3rd largest producer of coal & natural gas.

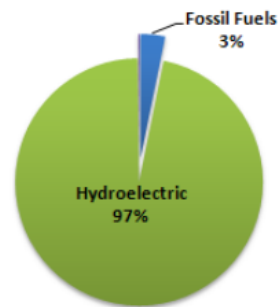
### Power Plants

- 15 natural gas
- 7 hydro
- 4 wind
- 3 coal



# Newfoundland & Labrador

Energy Sources (%) used to Generate Electric Utilities, 2011

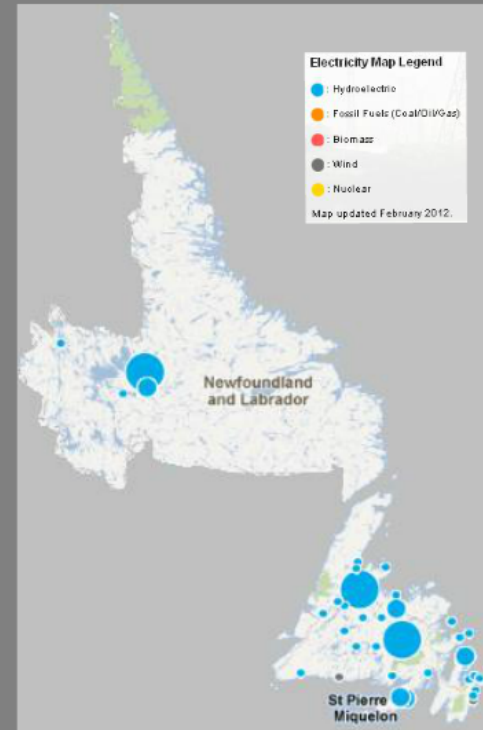


NEWFOUNDLAND & LABRADOR  
Energy sources used <1% not listed.

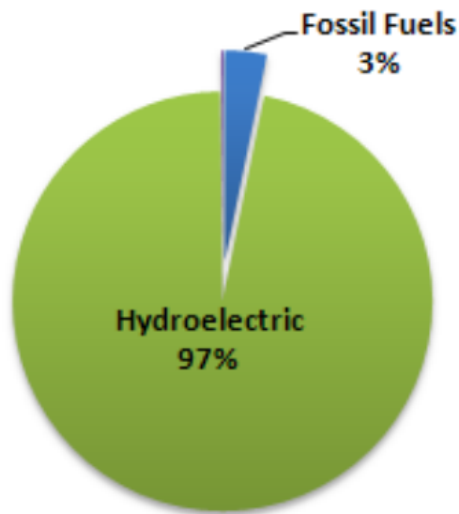
- Hydroelectricity supplies nearly 100% of electric utilities

## Power Plants:

- 40+ hydro
- 30 petroleum
- 6 natural gas
- 3 wind
- 1 biomass



## Energy Sources (%) used to Generate Electric Utilities, 2011



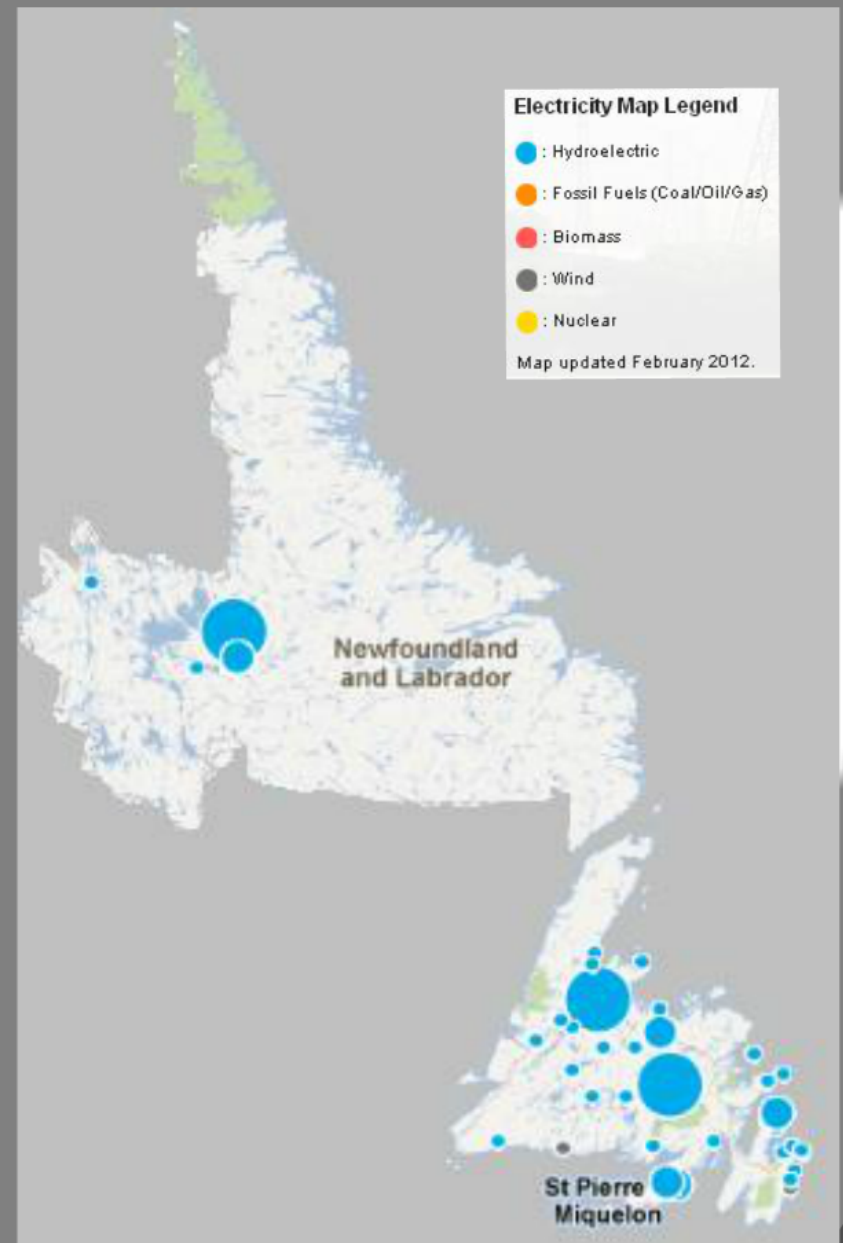
NEWFOUNDLAND & LABRADOR

Energy sources used <1% not listed.

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### Power Plants:

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- 30 petroleum
- 6 natural gas
- 3 wind
- 1 biomass



### Energy Sources (%) used to Generate Electric Utilities, 2011

A pie chart titled "Energy Sources (%) used to Generate Electric Utilities, 2011" for New Brunswick. The chart is divided into three segments: a large blue segment for "Fossil Fuels" at 61%, a green segment for "Hydroelectric" at 34%, and a small purple segment for "Wind" at 5%. A line points from the "Wind" label to its corresponding segment. Below the chart, the text "NEW BRUNSWICK" is centered, followed by a note: "Energy sources used <1% not listed."

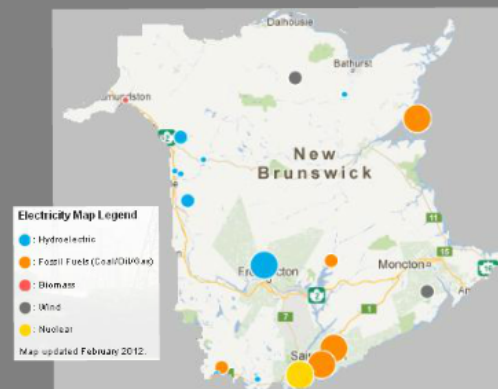
Energy Source	Percentage (%)
Fossil Fuels	61%
Hydroelectric	34%
Wind	5%

NEW BRUNSWICK

Energy sources used <1% not listed.

- ## Power Plants:

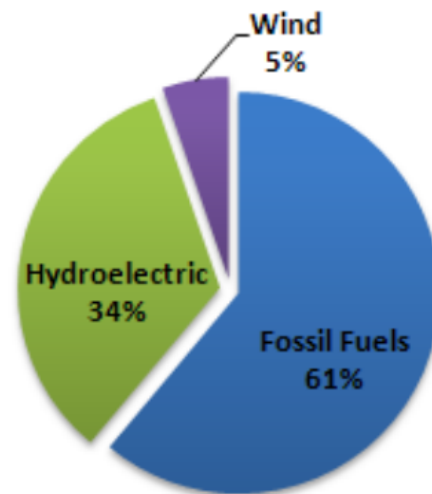
- 9 hydro
- 5 petroleum
- 4 wind
- 2 coal
- 2 gas
- 1 biomass
- 1 nuclear\*



Sources  
David Carson - Canadian Centre for Energy Information  
[www.centreforenergy.com](http://www.centreforenergy.com)  
<http://www.centreforenergy.com/electricity-man/>  
<http://www.centreforenergy.com/CanadaStateStatistics.aspx?Template=57>  
<http://www.cnh.ca/0085/pdf/EnergyCommFinal%20Report%20English.pdf>



## Energy Sources (%) used to Generate Electric Utilities, 2011



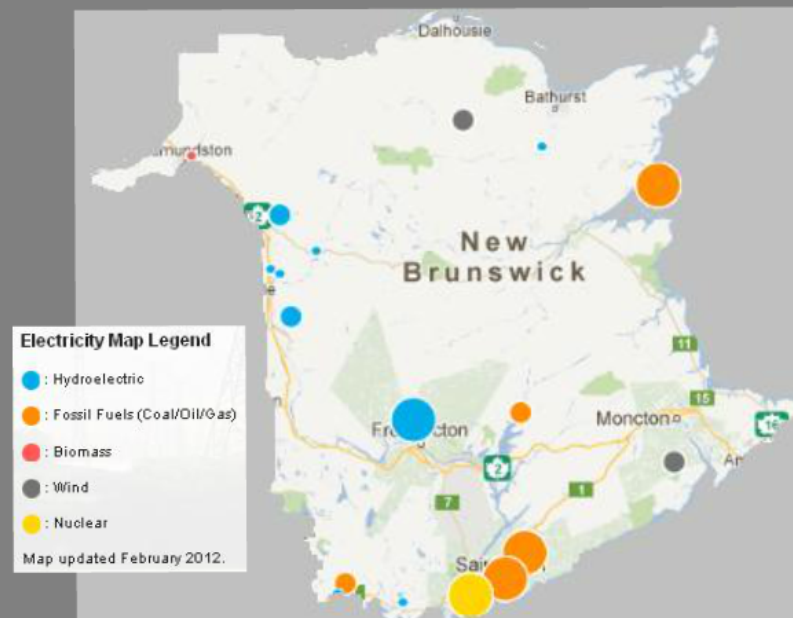
NEW BRUNSWICK  
Energy sources used <1% not listed.

- Fossil fuels supply over 60% of electric utilities
- Nearly 40% of remaining utilities from renewable resources

### Power Plants:

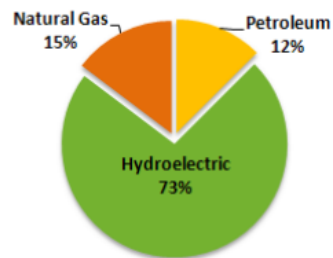
- 9 hydro
- 5 petroleum
- 4 wind
- 2 coal
- 2 gas
- 1 biomass
- 1 nuclear\*

\*Off line since May 2008 for refurbishment, expected re-start Fall 2012



# Venezuela

**Energy Sources (%) used to Generate Electric Utilities, 2010**



VENEZUELA  
Energy sources used <1% not listed.

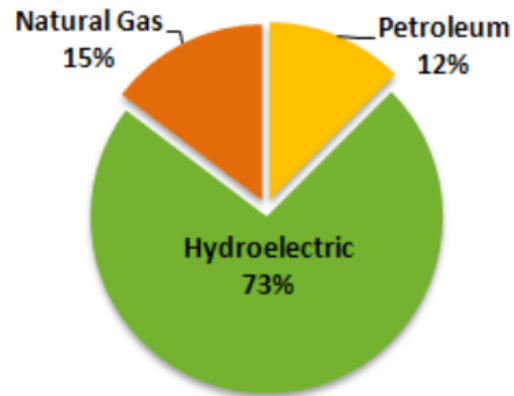
- Hydroelectricity generates over 70% of electric utilities
- 2nd largest natural gas reserves in Western Hemisphere.
- Over 90% of natural gas reserves are associated\* with oil reserves.

\*they occur along side oil reserves



Sources  
<http://www.eia.gov/countries/cab.cfm?fips=VE>  
<http://www.tradingeconomics.com/venezuela/electric-power-consumption-kwh-per-capita-wb-data.html>

## Energy Sources (%) used to Generate Electric Utilities, 2010



VENEZUELA

Energy sources used <1% not listed.

- Hydroelectricity generates over 70% of electric utilities
- 2nd largest natural gas reserves in Western Hemisphere.
- Over 90% of natural gas reserves are associated\* with oil reserves.

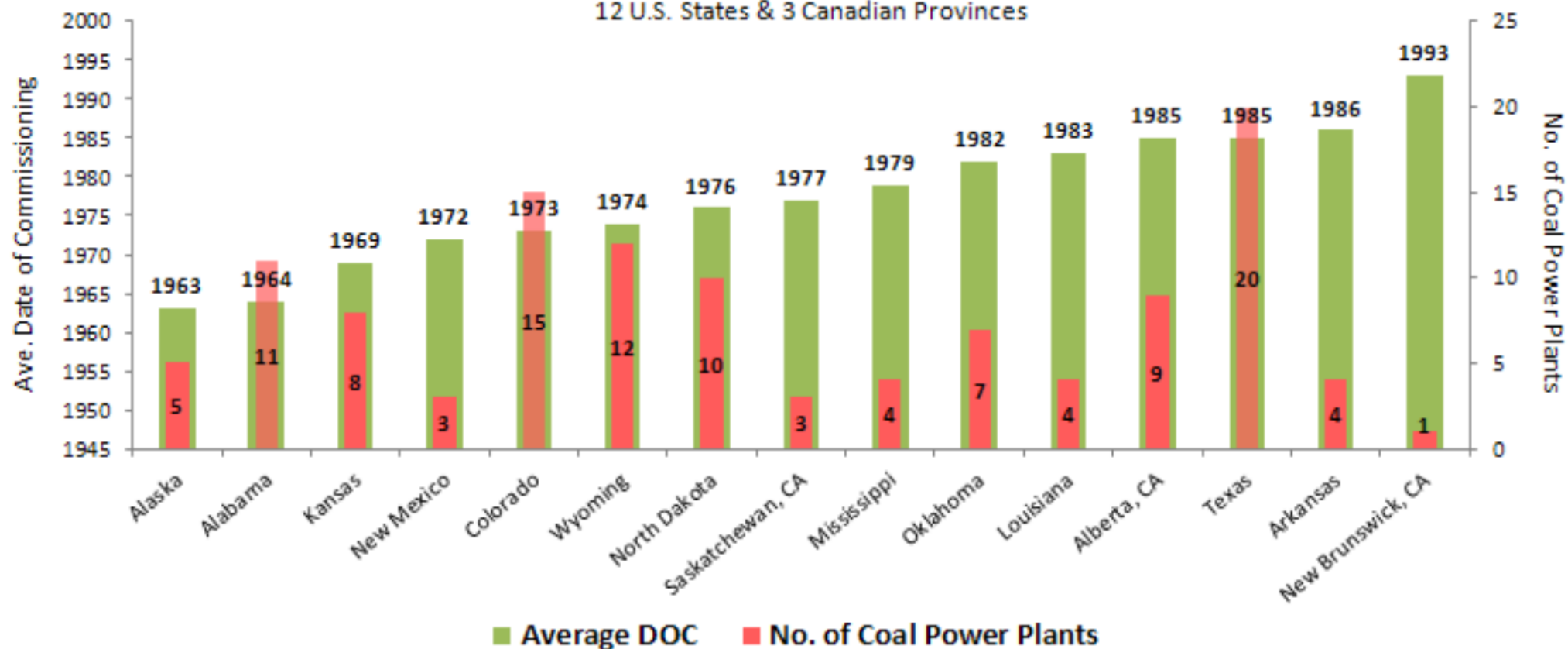
\*they occur along side oil reserves



## COAL POWER PLANTS

### Number & Average Date of Commissioning

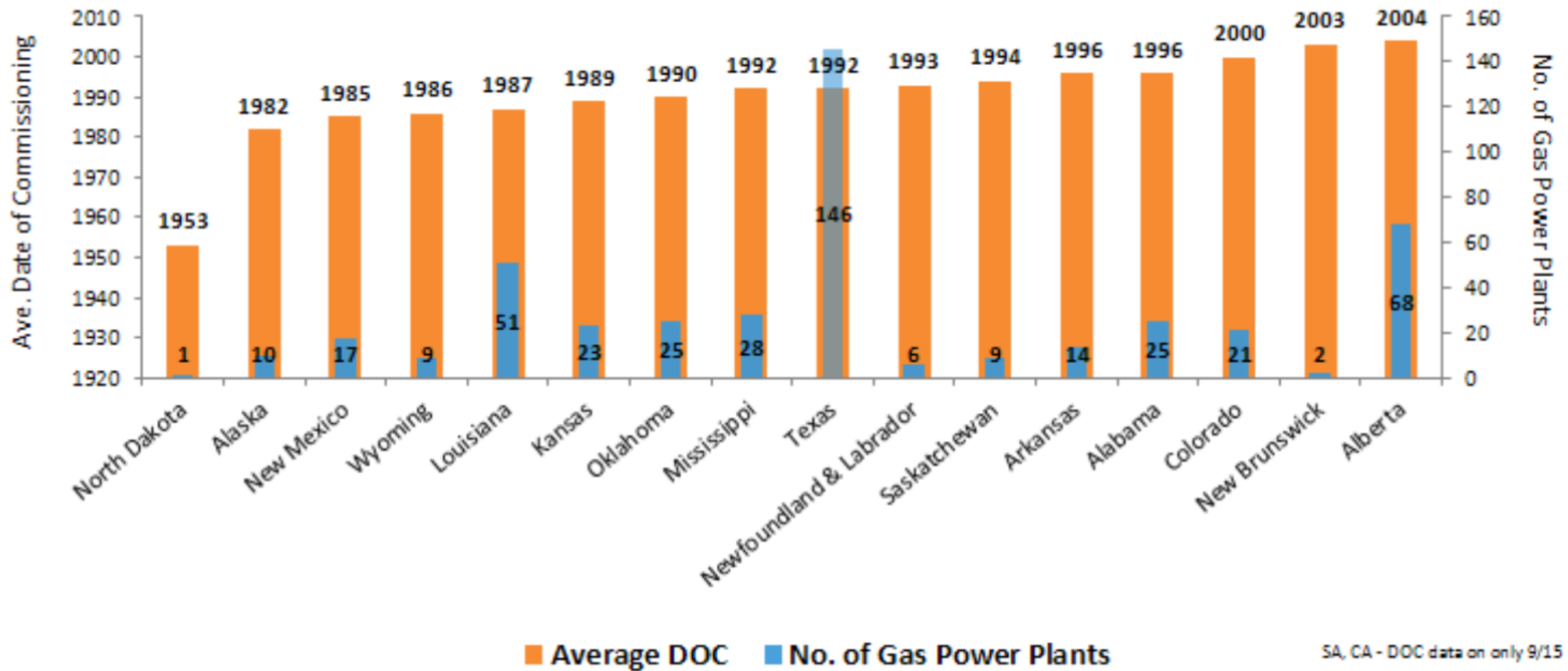
12 U.S. States & 3 Canadian Provinces



# GAS POWER PLANTS

## Number & Average Date of Commissioning

12 U.S. States & 4 Canadian Provinces

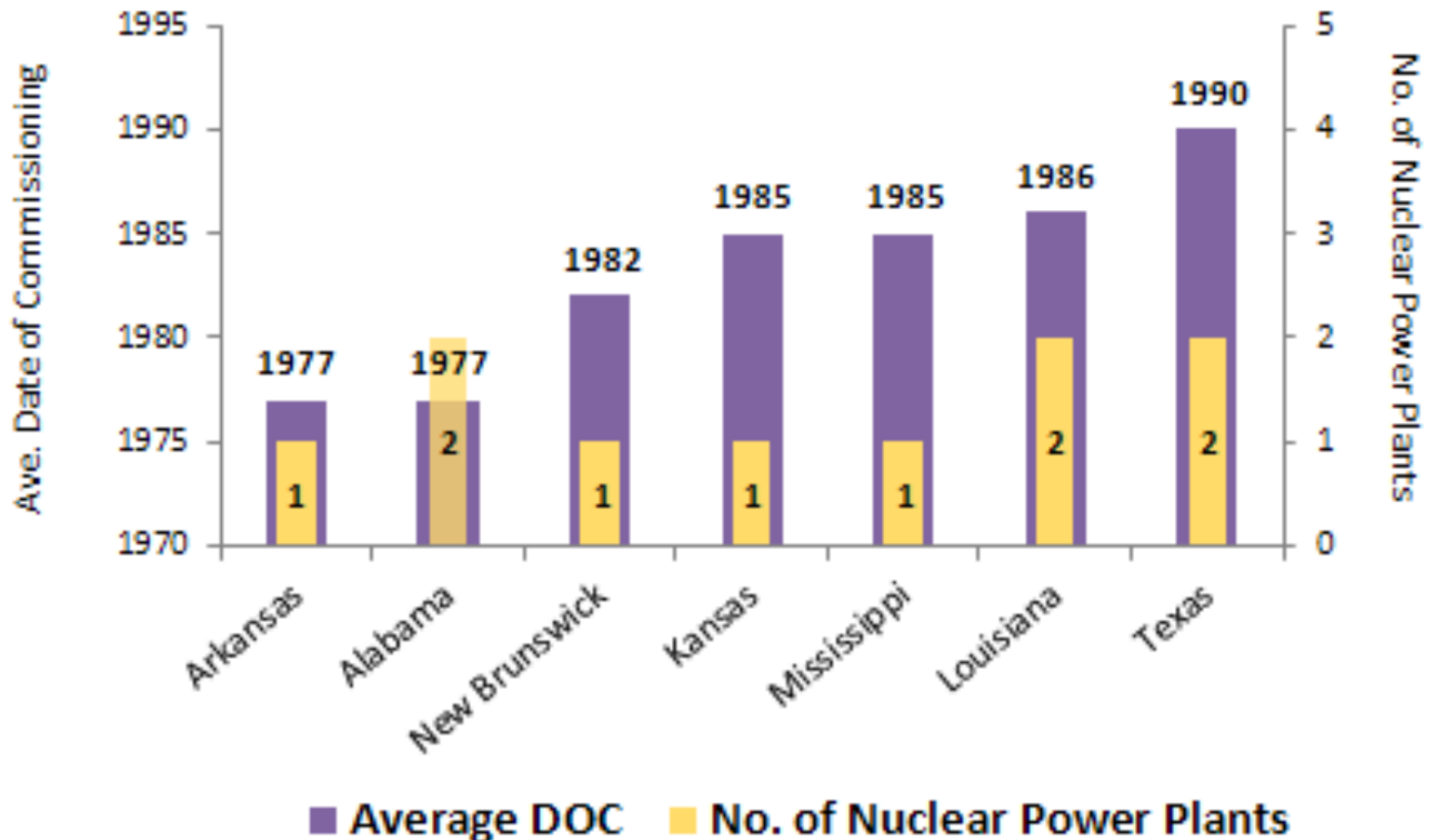




# NUCLEAR POWER PLANTS

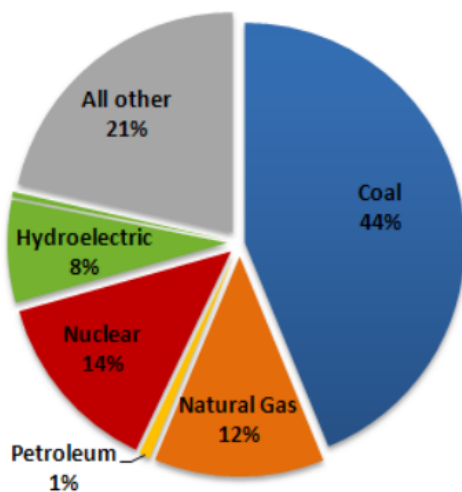
## Number & Average Date of Commissioning

6 U.S. States & 1 Canadian Province



### 2010 United States Totals

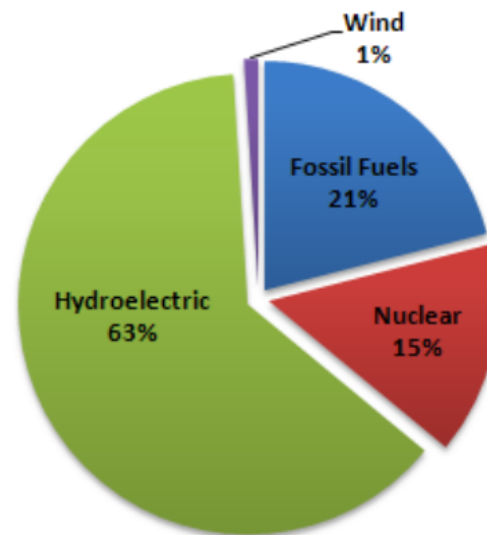
*Generated Electric Utilities by Energy Source*



Fossil Fuels: **57%**

### 2011 Canadian Totals

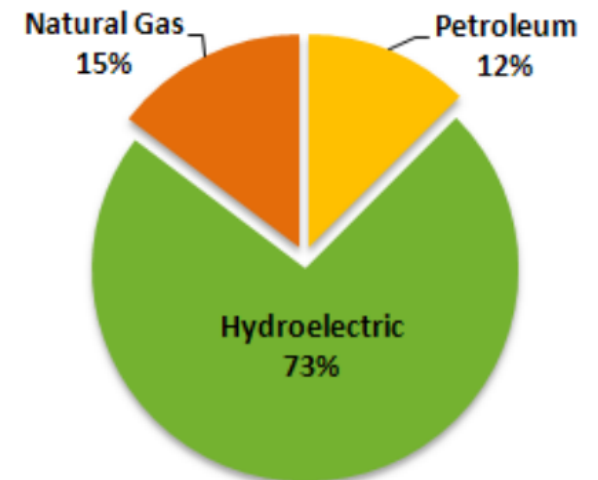
*Generated Electric Utilities by Energy Source*



Fossil Fuels: **21%**

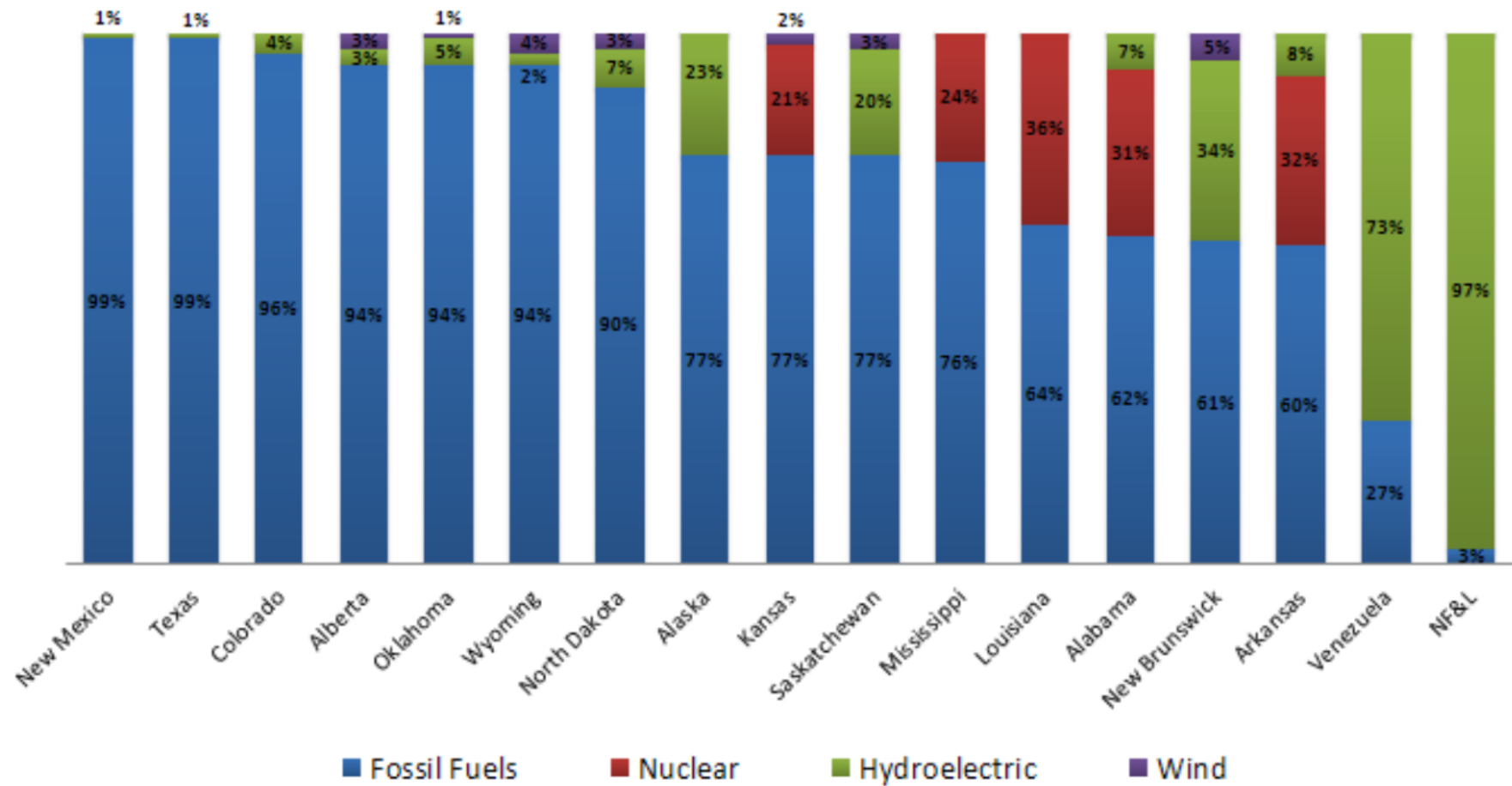
### 2010 Venezuelan Totals

*Generated Electric Utilities by Energy Source*

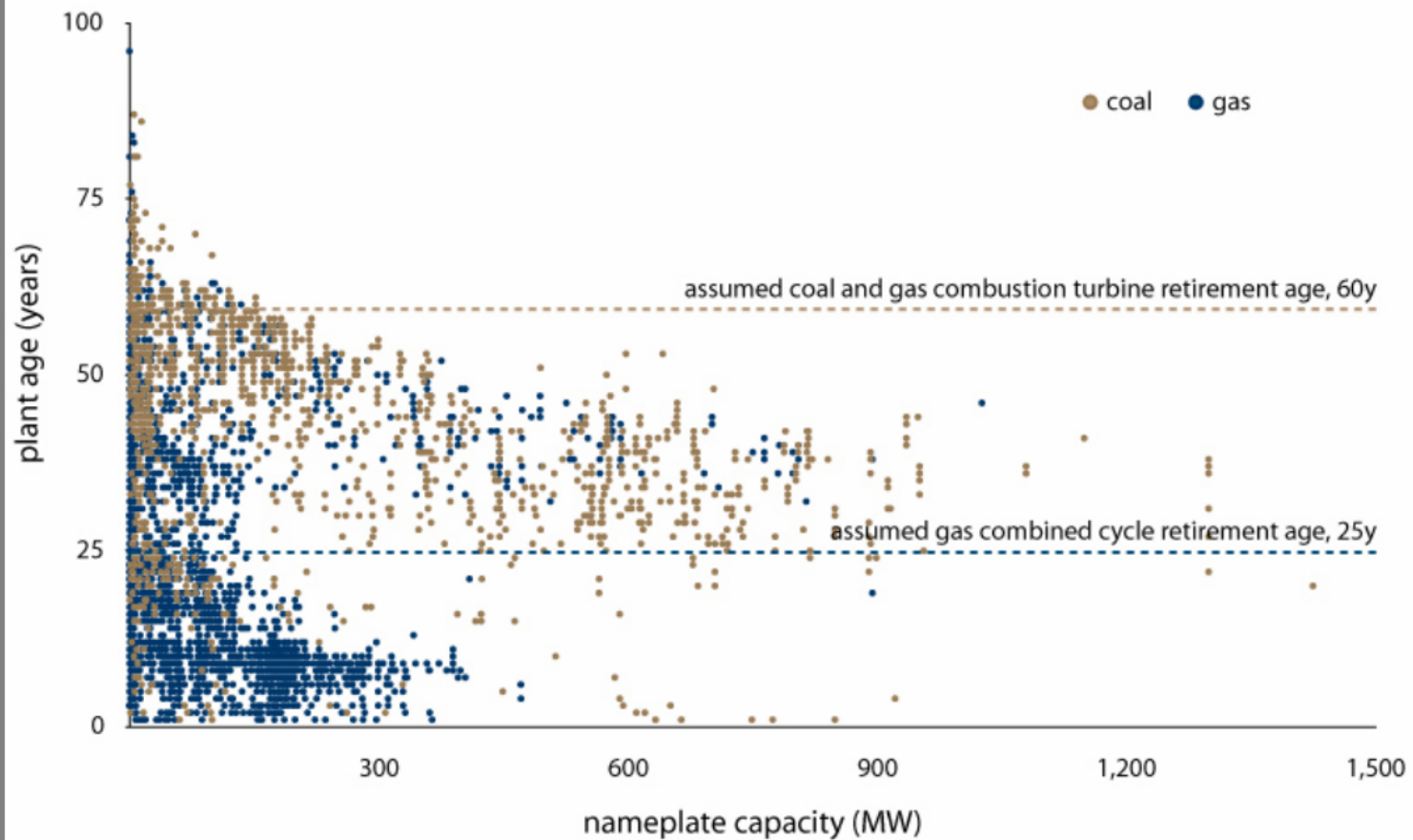


Fossil Fuels: **27%**

## % of Electric Utilities by Energy Source, 2010-2011



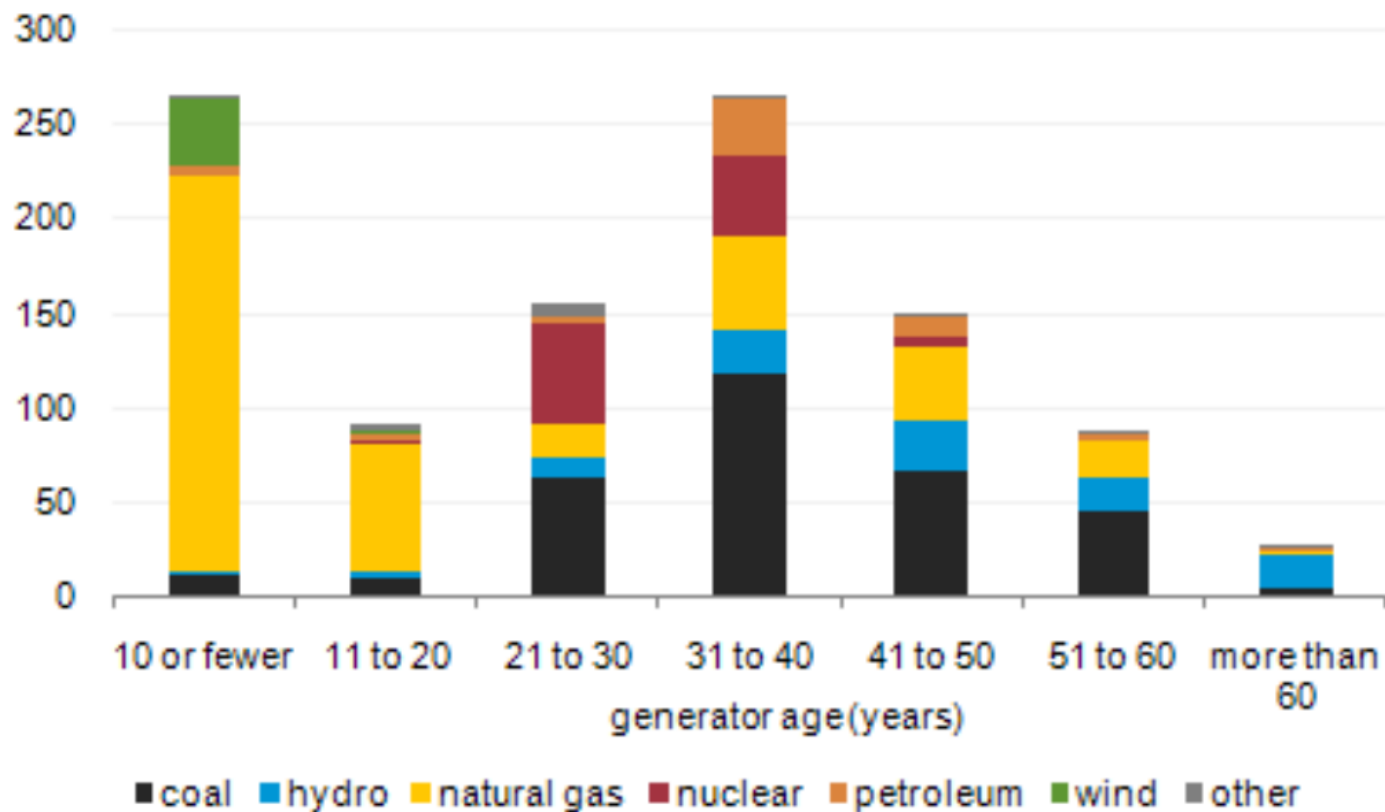
## Age and capacity of operating U.S. coal- and gas-fired generators, fall 2011



Rocky Mountain Institute © 2011. For more information see [www.RMI.org/ReinventingFire](http://www.RMI.org/ReinventingFire).

### Age and capacity of electric generators by fuel type, as of year-end 2010

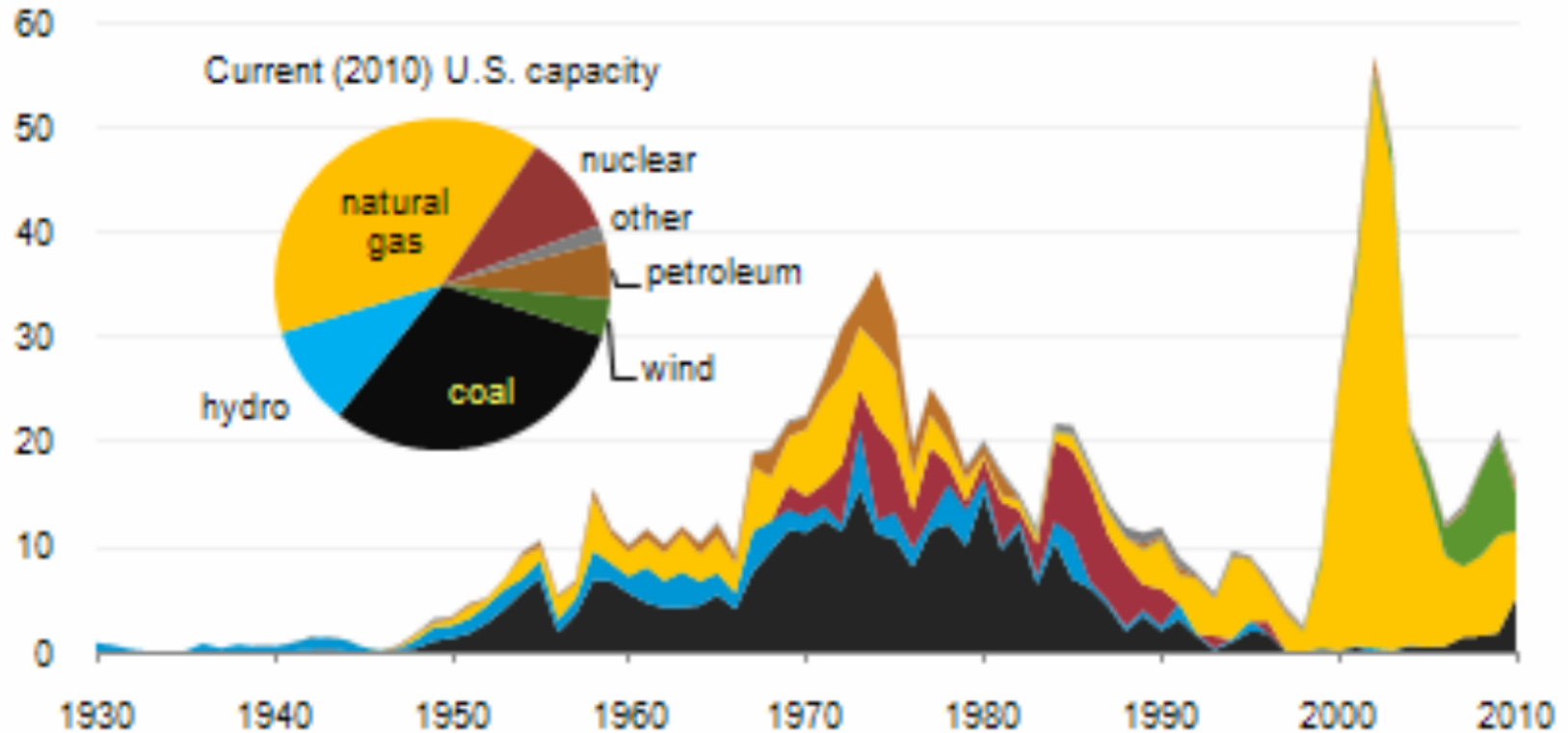
gigawatts





## Current (2010) capacity by initial year of operation and fuel type

gigawatts



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# A CLEER Look at Energy

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